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ABSTRACT

A system for developing public policy indicators would include social, economic, and environmental statistics which would define problems facing a political community. Policy indicator variables center around the broad needs of policy. Any measure of human conditions, including sources outside the basic disciplines, are used; intervals of observation could be weeks and months as well as years. The design of a policy indicator system begins with a definition of value variables as either social goal areas (e.g., health, development through learning, time and leisure, physical environment) and values corresponding to notions of general welfare (economic production, the duration of subjective well-being, and the distribution of these two variables among populations). The political community, as the user of policy indicators, includes elected officials, candidates, organized citizens, journalists, and the general public. Dissemination to these groups creates a problem in terms of timeliness and availability of data. Also, the choice and the use of contributory variables for the system depends on developments both in the political community and the scientific community that assess the quality, validity, and significance of measures. (KC)

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Value Indicators and Public Policy: Democratic Information Systems

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Value Indicators and Public Policy: Democratic Information Systems*

Duncan MacRae, Jr.

Political communities--nations, states, cities, and other decision units--need information to aid their collective decisions. An important contribution of social scientists toward meeting this need is the design of systems of social statistics, a part of larger systems that also include economic and environmental information. In this design process, we must choose[1] variables, measures of them, relevant populations, and modes of presentation so as to maximize their usefulness in view of the costs involved.

These choices require as explicit as possible a consideration of the uses to which the statistics will be put, and of the values that these uses will serve. Some of these values are private, and may be served by individual decisions (e.g., market purchases) as well as by collective decisions on public policy. Other values are public and ethical, involving notions such as those of the general well-being, of equity, or of moral rightness; these values play a distinctive part in the justifications we offer in public debate when we advocate policies. Such justifications are especially important in democratic regimes where public debate influences policy choices.

This paper is concerned with the bearing of public, ethical values on the design of social statistics to aid democratic decisions. The principles it proposes will bear, however, on non-social (economic and environmental) statistics as well.

The domain of statistical information with which we are concerned--let us call it "policy indicators"--overlaps with the field of "social indicators." As this latter field has developed during the past two decades, definitions of it have been ambiguous (E. S Dunn, 1974, p. 103), diverse (Carley, 1981, Ch. 2), and changing. One early proposal was that social indicators be statistics "of direct normative interest," i.e., that they measure values relating to the society or political community generally. An indicator statistic was expected to be chosen "such that, if it changes in the right direction, people are 'better off'" (HEW, 1969, p. 97); examples are measures of health, education and public safety. Such statistics are clearly relevant to public policy debates, as the variables they measure are ethical values.

Although these same variables, reflecting areas of social concern, are still extensively used in current research on social indicators in the United States, this valuative justification for them has become less frequent. In addition, it has been increasingly contended that social indicators have little direct relation to policy choice or evaluation. Instead, the criteria of scientific research have come to be emphasized: that the variables in indicator series be reliably measured over time and that they enter into theoretical models of social change (Sheldon and Parke, 1975, pp. 696-697). As important as these scientific criteria are, however, they are not sufficient alone for guiding our choice of variables for practical application.[2]

The domain of "policy indicators" that we consider here differs from this dominant definition of "social indicators" in several ways:

a. Its nature and use are principally defined by the values in terms of which its policy uses are justified; scientific methods and theories are important but secondary considerations. The generation of information in this domain is not considered a mere adjunct of basic research, which is then to be "applied"; rather, the choice of variables and the development of relevant models center about the broad needs of policy and practice. These models may overlap with models of social change and draw on contributions from basic science, but they center about possible policy intervention rather than the explanation of social change. Land (1975, pp. 20-21, 33) has defined a related domain of "social policy models," but the needs of policy and of basic scientific research are more distinct than he suggests.

b. We define an "indicator" as a measure of a concept or variable, in distinction from a statistic based on an indicator. Thus health is a variable; the infant mortality rate, a health indicator; and the infant mortality rate for a population, a health indicator statistic for that population. This distinction is necessary in order to avoid a separation of variables and measures used in reporting, from those used in policy analysis and choice; the same variables and measures can fruitfully be used in both, though often applied to distinct populations and analyzed with different methods.

c. It does not emphasize the distinction between "social" and "economic"; rather, it includes in a common framework any useful measures of human conditions and related variables whether derived from economics, other social sciences, natural science, or sources outside basic disciplines. We thus use the term "policy indicator" without the qualifier "social," to refer to a measure used in a policy-related statistical system, but also usable in relevant analyses of special populations for the study of causation.

d. It is not restricted to national statistics but deals with statistics used in political decision systems of sub- (and possibly supra-) national levels as well.

e. It is not limited to dissemination through publication at intervals of a year or more, but includes various other intervals of observation and modes of dissemination (e.g., weekly information disseminated through computer data banks).

My aim in this paper is to show how the development of this domain of statistical information, centered about anticipated use and guided by public values, would lead us in different directions from the conventional (United States) approach to social indicators as regards the choice of variables and indicators, the dissemination of information based on them, and related research.

Democracy and Value Indicators

In a given political community, information may be used to aid private, group, or public decisions. Private decisions that use information on the

state of a larger system are often adaptive; they include the choice by an individual whether to carry an umbrella, aided by a weather report, and the choice by a firm whether to invest in a new line of products, in view of trends in the economy. These private decisions are simpler in two important ways than public decisions. First, they require no public justification, from one deciding unit to another, in terms of shared values. Second, while they can be initiated by an indicator of general problems (weather or the economy), the actor's measure of the outcome of adaptive action requires only knowledge of his own situation (Did he get wet? Did the business lose money?). Privately used information can be analyzed from an economic standpoint (Machlup, 1962, 1980).

A family, a firm, or a neighborhood group within the given political community, if it makes decisions and carries them out by itself, is acting "privately" with respect to that community. When it does so it can also be said to be functioning as a smaller political community in its internal decision process. A group within the given community can also use its resources to influence the decisions of that community as a whole; labor, business, or professional groups make decisions of this kind when they take positions on public issues. The decision processes of any such group, if it has some internal democracy, involve discussion, compromise and invocation of the shared values of the group; externally, any such group must also formulate justifications of these positions which are persuasive to its fellow citizens in the larger political community (Dibble, 1962).

Public decisions, made collectively by the participating members of a political community, differ from private decisions in involving such justifications to a greater degree; and even though individuals' and groups' participation in public decisions has often been characterized as a mere play of private interests, we shall here stress the arguments that participants make concerning the general or public interest. Such arguments are presented in well-functioning democracies but also in some political systems with limited participation.

Even though public argument derives much of its force from an interplay of private interests, those who speak for these interests often support their claims by arguing that these claims promote the general good. Such arguments may be made by business ("What's good for General Motors is good for the country") by supporters of the working class as embodying the general good, or by the professions contending that their autonomous practice benefits their clients or patients. The quality of public discourse can be improved if we take these arguments seriously, design information systems for measuring and monitoring such concepts of the general good, and conduct research to test whether such arguments are valid. We do not necessarily try to "unmask" these arguments (Mannheim, 1949, p. 37) by pointing to the social origins or interests of the speaker; rather, we examine their persuasiveness in their own right (Steinfels, 1977, p. 5). In so doing we depart from political scientists' models of the "rational (selfish) voter" or economists' models of "public choice" based on maximization of individual "utility"; there may be truth in these models, but it is a partial truth.[3]

Public decisions are also more complex than private ones in the ways in which they use information. Participants in these decisions can use statistics on social and other conditions not only to define problems for possible action, but also to monitor the success of those actions.[4] As we attempt

to monitor the success of our policies, we also face the problem of separating policy effects from effects of other variables--a problem for all types of action, but more complex for public action than for private. This separation depends, as we shall see, on the availability of adequate models of causation.

We then take as a starting point for the design of policy indicator systems those values (e.g., general well-being, prosperity, security, or equity) espoused in the name of the political community for which the systems are being designed. We shall now use the term "values" to refer to these public, ethical values rather than to individual tastes. We may come to criticize some of those values; they may represent the interests of a community at the expense of its neighbors; or some may be unnecessarily specific, having blind spots that reflect the interests of dominant groups in the community. But as an initial basis for choice of indicator variables, these claims to serve the general welfare or common interest can often be operationalized and converted into statistics on the community's well-being.

We shall call those variables that are regarded in the community as ends in themselves (intrinsic values), and which are to be measured by indicator statistics, value variables. These may be of two kinds:

a. "Social goal areas" (Carley, 1980, pp. 185-190), such as the list of "areas of social concern" used by OECD (1976) in planning indicator systems: health, development through learning, employment and quality of working life, time and leisure, personal economic situation, physical environment, social environment, personal safety, and social opportunity and participation. These have also been referred to as aspects of the "level of welfare" (Drewnowski, 1970). For variables of this type we shall propose no major criticism of lists such as this except for a conceptual re-examination of their relation to more abstract value variables; this re-examination may in turn affect our choice of the indicators we use to measure the "social goals."

b. Abstract values corresponding approximately to notions of the general welfare, the public interest, the right or the good. These concepts themselves, when used in public debate, are usually not defined precisely enough to provide a basis for measurement; we compromise in choosing measurable variables (Johnston and Carley, 1981, p. 244). Yet three types of variables that are nearly as abstract will be recommended at the end of this paper: economic production (the gross national product or national income); subjective well-being together with its duration; and the distribution of the first two among population categories, including aspects of equity. Here the major innovation we propose is long-term development of a particular type of subjective value variable and clearer conceptual-valuative relationships between variables of types (a) and (b).

The operational measures of value variables will be called "value indicators."

We shall first illustrate value variables by "social goal areas" such as health, education, and crime reduction. Eventually, however, we shall seek more abstract criteria for choosing among such variables or among policies that aim at these social goals. We must also distinguish between means and ends. If a citizen contends that one health policy is better than another

because it will provide services more widely, we must ask whether he values these services for their own sake or as a means to health. Rival arguments can sometimes be reconciled by asking about more abstract values to which each claims to contribute. Thus as we proceed to discuss value variables, we shall later deal with more abstract variables that are considered to be intrinsic values--ends rather than means--in relation to prevalent value systems.

The choice and measurement of these more abstract value variables is then a first major concern of this paper; but it must be postponed till near the end of the paper, until we first analyze the notion of "use" in a pluralistic democracy.

Even if we can measure the changes in a value variable over time, we may still need other information in order to act on it. We need, of course, to know how our policies are likely to affect that variable. Moreover, the policies we make may have their effects indirectly, and we may wish to monitor intermediate variables that are affected by policies and that in turn affect that value variable. Non-policy variables may also combine with policies to affect it; these effects need to be set aside statistically both in defining problems and in monitoring progress. Policy indicator systems must thus contain measures of contributory variables[5]-- causes of each value variable that are either policy-manipulable or that enter our models of causation as statistical controls. Some of the controls may, over time, become manipulable, just as some aspects of the weather have become.

By our concern with public policy and values, as distinguished from value-free science, we imply an interest in variables that can be changed through policies; we do not simply seek explanatory variables regardless of their potential use. The models of interest to us thus overlap only partly with those studied in academic or "basic" social science. Some types of contributory variables that may be of special interest are:

a. Direct transfers of money or goods to persons in need, whether through the private or the public sector. These include the aid of families to their dependent members; unemployment insurance; income maintenance; and restitution or insurance to victims of crime.

b. The provision of services, or the availability of physical facilities, to individuals and groups (e.g., to promote health, education, or justice), and the amounts spent on them. The efficiency of these services and facilities, however, is often uncertain, and precise measurement of their efficiency can be hindered by the resistance of the professions who provide them. Categories (a) and (b) together include program outputs (Baster, 1976, p. 13), but also include the supply of the same outputs from non-governmental sources.

c. The prevalence of private cooperative behavior that furthers the purposes of public programs; Whitaker (1980) has referred to this as "co-production." Examples are protective behavior to reduce criminal victimization, transportation accidents, or lung cancer attributable to smoking. This sort of behavior may be either modifiable by public policy or relevant as a statistical control. The resources spent on it are also relevant.

Among the contributory variables may be quite specific administrative characteristics such as pupil-teacher ratios in schools, details of the administration of food stamp programs (Rich, 1981, p. 66), or measures of organizational performance. These variables may not seem general enough to include in national social reports (Johnston and Carley, 1981, p. 243); but the transition from general to specific variables, and from citizen to administrative audiences, is so gradual that we would be well advised to consider all these sorts of variables as parts of a functioning indicator system (Garn et al., 1976). Indeed, the effective choice of policies includes following them through the stage of implementation, in which factored problems (Allison, 1971, pp. 80-81) and specific measures of process and outcome are more important than at the stage of enactment. But even while we focus attention on highly specific program goals, we must remember to link them to the more general value variables that the programs were designed to serve.

An especially important temporal form for a contributory variable is a step function. A policy or program that begins sharply at a given time may be analyzed more easily than others with respect to its effects, through the study of time series. Although randomized experiments are a desirable type of research design for separating these effects from those of non-policy variables, quasi-experiments using time series (Cook and Campbell, 1979) are also an important means of tracing the relations between programs and value variables. Because of the parallelism between these time series and indicator series, the connection between indicators and policy evaluation is closer than has been suggested by Parke and Seidman (1978, p. 5).

The causal relations implied by the term "contributory" may be established by scientific research; or they may be judged to exist on the basis of experience, expert opinion, or public opinion generally. Thus for health as a value variable, both health services and environmental conditions are included in indicator systems as contributory variables, even though our scientific knowledge of their effects is incomplete. For crime reduction as a value variable, police budgets, the skills and numbers of law-enforcement personnel, and community crime-protection activities are treated as relevant even though their effectiveness is sometimes uncertain. We include contributory variables about which our knowledge is uncertain, not to make a virtue of uncertainty, but to stress that we normally work with imperfect knowledge and that we cannot usually wait for scientific certainty.

When the collective choice under consideration is to be made democratically, we shall refer to information systems designed to aid it as "democratic information systems." The proper use of information in a democracy, and its relation to indicator choice and development, will thus be a second (and earlier) major concern of this paper. By dealing with "information" rather than simply with indicators in the conventional sense, we can enlarge our perspective and consider other possible forms of information besides annual statistical series published in printed form. Not only possible new items of information, but their relation to pre-existing information, must also become part of our analysis of the values and uses of information.

I have deliberately chosen the phrase "democratic information systems" for its similarity to "management information systems." In the management field, there is an extensive literature on the technology and uses of information systems. This field of application is typically one in which the

users occupy roles in an organizational hierarchy, and in which managers can presumably be more effective by using better information about the organization.

In a democracy, however, it is the departure from hierarchy that is essential; this remains true even as the degree of democracy varies. Even though there is a special need for government officials and citizen leaders to have accurate information on the state of their society and economy, it is vital that this information and the policies based on it be subject to criticism from the general public. The task of developing information systems that are accessible to the public, and that contribute to reasoned analysis by the public of issues and policies, is far more difficult than the design of management information systems. It requires that we reconcile the calculations of specialists with the intelligibility of their reasoning to the public (Hanke and Walker, 1977, p. 352). In this sense the phrase "democratic information systems" implies an unavoidable tension between expertise and democracy (MacRae, 1976, ch. 2). The enlightenment of the public can reduce this tension, but we need to examine specifically how best to bring it about.

The choice of indicator variables--or more generally, of modes of information--suitable for democratic policy decisions thus involves somewhat different criteria, not only from those that have prevailed in the scientific approach to social indicators, but also from those that would be used to choose indicators in a hierarchical political system. The initial valuative (normative) concern of the social indicator movement must remain important insofar as democracy requires justifications in terms of the public interest and not merely the play of private interests. Reliability and theoretical validity of variables also play a part, but they cannot be the sole criteria for the choice of practical indicator variables. Manipulability must also retain its importance as a criterion in any indicator system designed to guide choice and action. Intelligibility and communication to a wider public must be a special concern for democratic indicators; but beyond this, the public and its leaders have a part to play in the institutionalization and termination of indicator series.

New Information as Value Added

New types of information such as indicator series, data banks, and management information systems do not exist in isolation; rather, they supplement a pre-existing body of knowledge and information as well as judgments based on experience (Lindblom and Cohen, 1979). The use-value of new information sources is therefore an incremental value, depending not only on what is added but on its relation to the old in intelligibility and compatibility. Indeed, in all human information processing "perception is guided by mental structures existing prior to the act" (E. S. Dunn, 1974, p. 32). This relation requires special attention when there is a cultural disparity between the source of new information and the intended user, as often occurs when information is used to aid national or local development. One example of the need for adaptation and compatibility is found in the planning of applied, as against basic, scientific research. As Ben-David (1971, pp. 174-7?) points out, one nation can imitate another in designing institutions for basic research, but it cannot so easily do so for applied science. For the latter, not merely the self-contained communications sytem of basic science but its contact with external sources of

information and channels of application must be considered.

Pre-existing information (including non-statitical information) is sometimes considered "pre-scientific" and thus antiquated and inadequate. The discourse of "laymen" may thus be seen as liable to error and needing correction through wider education in science. The internal quality control afforded by peer review in science, and the precision afforded by special terminologies with precise meanings, are seen in this perspective as having superior value for the precise definition of problems and causal relations.

Common-sense knowledge, however, can also be taken seriously and regarded as equal or superior to specialized new knowledge. "Ordinary language" has been analyzed in detail by philosophers, suggesting a precision and subtlety that may be latent in common speech. "Ethnomethodology" refers to the study of methods, or methodology, of the nation, or (loosely) of the "tribe"--the actual approaches used in human communication for ascertaining presumed facts (Garfinkel, 1967). The interpenetration of "tribal" bases for judgment with the official and presumably rigorous procedures of natural science (Kuhn, 1962) or social science has been used by some critics as a means of deflating the claims of these sciences. Habermas' (1970) advocacy of a new and expanded mode of communication, combining technical discussion with the participation of the public, also involves criticism of elite technical discourse cut off from that of the public. Whyte (1982, p. 5) points out that in the task of increasing corn yields in Mexico, peasants' ideas and information were superior in some respects to those of their technical advisers.

A specially important type of pre-existing information is that possessed by types of experts or cultural elites other than the group proposing to add new information. Thus one specialty can occupy the status of "layman" relative to another (e.g., Koopmans, 1979). Lawyers occupy a special position relative to scientists by making special claims to rigorous thought and language without claiming scientific competence as such. Literature and the arts also have as one of their functions the interpretation of human conditions.

This "value added" perspective, when the new statistics are to be produced by government, is analogous to a line of reasoning used by economists to judge whether government action should be taken to remedy market failures. According to this approach, a perfect competitive market would allocate resources so efficiently that (if efficiency were our goal) government would not need to intervene except to maintain the conditions for the market. If, however, an actual market lacked some of the properties necessary for perfect competition (e.g., if it involved monopoly, externalities, collective goods, or inadequate information), then there would be a prima facie case for government intervention. The government itself, however, can fail to perform optimally (Wolf, 1979); and to the extent that there may be "government failure," this possibility reduces the presumption that we should choose government as a remedy.

The supply of information by government, like other types of government action, can thus be either a remedy for prior deficiencies or a source of problems itself. From an economic perspective, we can make a case for governmental supply of information. As an economic good, information is often collective; once produced for one consumer, it will be available

automatically or at little cost to others. It will thus be under-produced by the private market. When information is produced by government, however, we need to be sure that it makes a net positive contribution. Official statistics can be used to serve powerful private interests and the interests of government itself--to support their actions or to conceal their shortcomings, as Henriot (1970) has pointed out.

"Government failure" has indeed been a major theme of political philosophy, and not merely an afterthought appended to a theory of market failure. Governments may "fail" not only in the substantive outcomes they produce in the short run, but in the processes or structures of power they create, affecting many substantive outcomes in the longer run. Among the various ways in which we can protect ourselves against such failures, four features of information systems are particularly important: (a) expert control and monitoring that insure their quality; (b) their intelligibility to a wide public; (c) public scrutiny that can provide alternative information sources if these systems should be misused; and (d) avoidance of their use for monitoring political dissent.[6] For the lesser types of failure that result from low technical quality or bias toward particular interests, representation of methodological expert groups and diverse political interests in the review of information systems can provide some protection (de Neufville, 1975, pp. 70-86). Beyond these types of review, freedom of speech and of the press can provide a counterweight to the dominance of government information systems by self-interested officials. And for the major types of failure in which information on individuals or groups can be used to silence them politically, safeguards against such uses of information by government are vital.

Political Community as Client: Values and Roles

If we are designing indicators for collective decisions, we must first identify the political community[7] to be served by decisions based on them. At the same time, we must recognize (or choose) the places where decisions are to be made about the generation and use of information--e.g., the legislative, administrative, or judicial organs of central or local government. Sometimes a combination of levels of government is involved, as in development policy where the particular paths of development vary among localities but require national coordination.

A political community, whether national or local, that needs information about itself is likely to have at least a certain minimum size; a single family does not need indicators of its own well-beling, nor does a small community in which all members know one another well. The size of the political community, and the social distance that size entails, require us to supplement our personal knowledge of one another by statistics. Even in a larger political community, however, what citizens learn from statistics is "value added" to what they know from personal experience.

If a political community is to use indicators, it must possess the required skills and objectivity on the part of those who produce and use the statistics, and support by citizens and leaders for statistical quality. Indicator information can lead to embarrassing questions and controversial conclusions, which would sometimes be easier to suppress. If we believe in knowing the truth about ourselves,[8] we must be prepared to tolerate and even support the messenger who brings bad tidings. Not every political

community is willing to do this; and if we could ascertain this willingness before designing indicator systems, we might well be selective in our choice of communities to serve.

Stability is also a necessary condition for the collection and use of indicator statistics. Continuing data series require continuing political support; in a pluralistic democracy with diverse possible majorities, this means a broad consensus. Zapf (1972, p. 249) has characterized the political orientation of the social indicators movement as "liberal incrementalism." Insofar as indicator systems merely define problems in terms of departures from a previous situation, they can involve the bias that all problems and their remedies are seen as temporary and the previous situation as essentially satisfactory (Sharpe, 1978, pp. 309-310). But an incremental approach to the use of indicators, presuming some constancy in the framework for decision, can be employed in socialist systems as well (Osipov and Andreenkov, 1979).

Let us then assume (temporarily) that we have chosen to serve a political community as an ultimate client. We shall then face questions about its collective values, and eventually, our own roles. If we intend simply to serve this "client" we have taken an "outsider" role, in which we provide expertise (means) and the community provides values (ends). Often, however, we deal with parts of a community, thereby making ethical choices similar to those we make in choosing to work with the community in the first place. In either case we forego the right to participate, in that role, as a citizen.

This "outsider" role, which takes the community as client, may be chosen by social scientists on the basis of either philosophy (positivism) or prudence. Prudence may dictate their keeping a certain distance from current controversies in order to sustain longer-run values concerning method and theory, or to further the viability of the institutions that generate information.[9] The "outsider" role is occupied of necessity by foreigners (Brewer and Brunner, 1975, pp. 10-11); it is usually also the stance of paid consultants or employees, who by taking pay commit themselves to serve the client's or employer's goals. Some elected public officials also come close to assuming this role, seeking to serve their constituencies but not to persuade or perhaps even to lead them.

If we are merely outsiders in this sense, regarding the political community as a client, we face the problem of choosing or identifying the values that we shall serve among multiple sets of values, some explicit and others scarcely articulated, in the community. Just as evaluation researchers often have problems in discovering the "true" goals of the programs that they seek to evaluate (Weiss, 1972, pp. 26-30), the consultant to a community has problems that are similar but greater. The political community, unlike an organization or program, is rarely founded for a purpose. Its culture often embodies dominant values, but in a free society a respect for diversity is also encouraged. If we are recommending value-guided information systems for a diverse or pluralistic political community, we cannot easily say that particular values are "official." If government is to sponsor the collection of information over the long term, then the various groups in the community must have sufficient consensus to support the gathering of this information as governments change. This consensus, if it does not exist on every particular value, may be built through bargaining or logrolling so that multiple clienteles, each seeking its own values, nevertheless agree to

sustain the whole enterprise.[10] Such a consensus requires cultivation if it is to last. It may also require the limitation of public support for information that might exacerbate major conflicts within the community. But within these political constraints, experts may still be able to propose information systems that are better than their alternatives.

The values implied in statistical series developed in this way are likely to be least-common-denominator values: either subjects of broad consensus (the GNP); matters of interest to particular organized constituencies and not strongly opposed by others, supported by coalitions (statistics on science or on the handicapped); or measures that may be interpreted diversely by various groups (statistics on marriage and divorce). We shall ask at the end of this paper whether other abstract "common denominators" of value besides the GNP could usefully be incorporated in indicator systems.

I have spoken of the political community as an ultimate client; but I have also acknowledged (by speaking of groups) that we may not be dealing with its members directly. We cannot do so easily in a large community; typically we deal with government officials or group leaders as immediate clients. We may think ideally of the citizens as the primary users of indicator information; but in actuality information systems for urban or national planning are used primarily by public officials.[11] An information system in Cologne in the early 1970s, for example, required permission from the responsible department before someone outside that department could use it (Beresford et al., 1976, p. 303). The acceptance and support of indicator systems can also depend importantly on bureaucratic politics (Rich, 1981). The public's participation may then depend on the initiative of active group members or of the media, seeking out statistics, selecting and publicizing them.

The government officials with whom we deal may, as we have noted, be moved by personal motives or by specific, factored aspects of public problems as well as by concern for the public good in general. So, too, may be the academic or professional who advocates the collection of indicator data so as to favor the activities of experts from his own specialty, or who directs attention to types of problems emphasized by his personal values. If we regard the political community rather than the present government officials as our client, we may wish to deal with persons who are dedicated to its long-run well-being. We may also wish to promote wider participation in the decision as to the choice of indicator variables. Even if we (as professionals) could choose variables that reflected the true interests of the community, without participation we could still risk lack of support for the indicator system. Thus participation can also provide a sort of parallel information system, in which dissent or difference of opinion can reveal other values than those of officials or leaders.[12]

Even if we could bypass government officials and deal with the public, the problem of representativeness would not be automatically solved. The groups that can most easily pay us as consultants or understand our technical language, and those that use statistics most, are not necessarily those most in need of help. Political systems that are officially democratic can never represent all groups with exact equality, and the group systems in those polities often reflect the same "bias" as the officialdom. One approach to even-handedness has been proposed by Coleman (1980, pp. 346-47), who suggests a style of "pluralistic policy research" serving not a single

client but a variety of interested parties in society. Presumably a designer of indicator systems might do likewise, seeking to increase but diversify their use. This role would maintain some of the detachment characteristic of academic research, taking a position near the "truth" end of Price's (1965, Ch. 5) "spectrum from truth to power." Alternatively, we might consider setting ourselves against the bias of the system, taking underrepresented groups as our clients, but at the same time risking no longer aiming at a general public interest as well as becoming less effective.

The option of choosing and advocating particular values and policies, however, suggests another role we may occupy besides that of the "outsider"--that of an active member of the community. For citizens and leaders of the political community there is an opportunity to take the initiative, to try to persuade others, and not simply to listen for the composite preference of the other citizens. This opportunity exists by right for citizens of a democracy, and is not merely insinuated into the relationship as it is for a consultant with a client.

I have addressed the reader so far as though "we" are social scientists--whatever other roles we may occupy. Those of us who are also active members of the political community may be elective officials or candidates for office, seeking to lead their constituencies and not simply to follow them. They may be government officials, trying to facilitate their work, coordinate it with that of other agencies, and respond to the public directly or through its representatives. They may be citizens, organized in groups, seeking not merely to increase consciousness of an issue by publicizing conditions such as unemployment, illness, illiteracy, or inequality, but also to monitor possible progress toward reducing such conditions.

The goals and resources of these various groups and roles may differ. But regardless of which of these roles we ourselves may occupy, all of them must be involved ultimately in any successful indicator system. Public officials, or continuing private organizations, must administer the information-gathering system, and other officials and organizations must be among its users. Citizen groups must provide continuing political support and criticism. Together with these groups, "outsider" experts are also necessary to monitor the quality of the information presented and to relate it continually to their theoretical understanding of causal relations. The interrelations among such groups have been an essential condition for the institutionalization of indicator series (de Neufville, 1975, Ch. X).

These active roles in the community may simply happen to be occupied by persons who are also social scientists. A person who thus combines the two may compartmentalize his or her activities into those undertaken as citizen and as scholar. Yet it is also possible for the two types of roles to be combined somewhat. One relatively active role is that of "public interest science" (Nelkin, 1979, pp. 114-16). Some natural scientists, who feel social responsibility for the uses of their specialized knowledge in relation to their notions of the public interest, have joined in groups to analyze public issues and take stands on them. Social scientists have done likewise (MacRae, 1976, p. 75). Such roles are not, however, always consistent with the "neutral expert" role that is more characteristic of scientific communities. In practice, those who take this role and become involved in controversies risk belittlement by their fellow citizens of

their claim of scientific expertise, especially if they are social scientists. Such public judgments may extend to their disciplines as a whole.

The combination of scientist and citizen roles by social scientists thus faces practical limits. At the same time, however, values are embedded in the discourse of the social sciences (MacRae, 1976). In economics, however, an entire discipline has been able to associate itself with a value position which (at least in the United States) does not seem controversial to the same degree. The values of benefit-cost analysis, or of the GNP, have been used within the discipline and in public discussion as bases of policy recommendation. We shall suggest later, in connection with abstract indicators, that conceivably another academic group could attain similar non-controversial unity in studying and advocating subjective value variables.

Dissemination: Time-Scale, Technology, and Motivation

In supplying information to a political community we must also choose the specific ways in which that information is to be disseminated. "Dissemination" implies a process of making information freely available; but as we shall see, effective dissemination requires us to consider the motivations of our audience and thus leads us back to the values of particular persons and groups in the political community.

The most common (but not necessarily the most useful) mode of dissemination of indicator information has been publication in volumes of statistics at intervals of a year or more. This technology implies that the age of the data on the date of publication is at least the length of time required to publish, and that in the interval between published volumes that age will increase by at least a year. If decision-makers, or the public, wish access to more recent data, they will require not only more frequent gathering of data but also more frequent publication, such as is offered by periodicals or newspapers. The most rapid access is afforded by computer data banks; but the recency of data is then limited more by the time required for collection and assembly than by the time for entry into the data bank or for access.

In addition to the time required for collection and dissemination of information, there is also a time interval required initially to set up the organization needed to perform these functions, or to expand the capacities of existing organizations. Some collective problems and our responses to them occur so rapidly that, at least at first, communities have had to deal with them without statistical time series: a sudden spill of a pollutant, a drought, an epidemic. But similar problems can often be seen or anticipated with the aid of time series: gradual changes in the concentration of carbon dioxide in the atmosphere, depletion of the water table, or incidence of diseases whose significance cannot be assessed without careful counting. Problems that develop slowly enough that time series can help to anticipate them, and occur often enough to justify the expense of organizing to collect data, may be appropriate for indicator series.

Those problems that are usefully recognized through annual publications (or decennial censuses) are likely to be relatively slow to develop.[13] To supplement such sources and sense shorter-run changes, we rely also on monthly reports of unemployment or inflation, or of leading indicators such as

housing starts (for both private and public purposes). The Continuous National Survey of the National Opinion Research Center reported at approximately four-week intervals (Rich, 1981, p. 25). Our information systems have thus already recognized that indicator series have various appropriate time intervals.

We must therefore distinguish among modes of dissemination, especially as regards the time-scale of availability they permit. The time-scale, if not limited by the requirements of printing books, can allow us to consider more frequent updating of series in relation to their use and cost, and to ask whether different types of contributory variables are appropriate to different frequencies of observation and ages of data. For health as a dependent variable, for example, in the short run we might examine the frequency of emergency immunizations as a contributory variable; in the longer run, we could consider preventive public health measures or changes in lifestyle.

The same sorts of differences in time-scale pertain to the speed of our possible actions and their expected results. If we are dealing with long-term effects and thus contemplating legislative action linked to an annual cycle of hearings and budgets, we may find annual series adequate. If, however, we wish to "steer" a system such as the economy through more frequent action (as the U.S. Federal Reserve Board does), or to control an epidemic, then more frequent data may be needed. Our need to monitor results rapidly, however, depends on the speed with which our action has its effects. Whereas immunization against disease can have a rapid effect, policies aimed at changing inflation or economic growth often require several years to be felt, and the education of a new generation may not have its full effect for decades.

We may thus consider data banks, frequently updated and rapidly accessible with the aid of attendant services (E. S. Dunn, 1974, pp. 219-220), as the mode of dissemination for rapid action. The most rapid action is often the least democratic, however, since public awareness and understanding of a new problem can take time to develop. (Completely automated, instantaneous action can bypass human intervention and judgment altogether, once the computer program for response has been written.) Newspapers, periodicals, and books are print media corresponding to various longer intervals; decennial censuses can trace still longer-run developments but do so in greater detail.

These means of dissemination assume that users seek out information by interrogating a data source (e.g., telephoning or querying a computer), going to a library, or buying a periodical or book. Users may also obtain statistical information as part of a bundle of information-type goods (buying a newspaper, subscribing to a cable television service). But if newspaper headlines alert readers to problems, the newspapers and their reporters must presumably seek out the information first. Similarly, if a public official is to use indicator information to call the public's attention to a problem, the official or his staff must first seek out that information. And in the utilization of evaluation research, Patton (1978, Ch. 4) has stressed the importance of having a strongly motivated client who needs and seeks the information.

To define problems for a political community, we need means for bringing signals of warning or of progress[14] to the attention of relevant publics; and we need to define special social roles such that persons in

them may attend to such signals for the community (like forest rangers in observation towers), thereby enhancing the observation capacity of the public through a two-stage dissemination process. The use of statistical information for public decisions thus depends on the identity and motives of those who seek it out and interpret it.

These specially motivated users may be journalists, public officials, political candidates, party or group leaders, staff assistants of such leaders, scholars, or interested citizens. They include, in other words, the active members of the political community whom we have mentioned above. Their motives can range from personal advancement--for a news scoop or a telling campaign issue--to a concern for the public good, or a mixture of the two. They are often led, however, to interpret information in terms of the public good because of their need to gain the attention or support of uncommitted citizens. Conflicts between interested parties are often enlarged in scope by the involvement of the spectators (Schattschneider, 1960, Ch. 1).

The dissemination of information to motivated users may be different from dissemination to the general public. It may require periodically updated data banks that can be accessed quickly for the user's purposes, disaggregated (within the limits that privacy permits), and shaped in different ways for different users (Johnston and Carley, 1981, p. 252). In this respect, even apart from questions of time scale, information may well be disseminated in the form of data banks and not simply in books.

To a limited extent, analyses and interpretations of these data can also be made available in the same way as the data themselves (Mare, 1981, pp. 111-112). Like scholarly publication, however, the preparation of these analyses can cause delays in relation to the needs of decision. Moreover, various groups of users might require different sorts of screening of these analyses in terms of quality, intelligibility, and valuative bases; and "official" interpretations must not attempt to resolve controversial issues prematurely.

The appropriate channels and styles of dissemination of data and interpretations thus differ among user roles. We can recognize three types of motivated users in terms of the values they represent: (a) representatives of groups with material interests in policy outcomes; (b) persons who advocate policies in view of notions of the public interest--a category that partly overlaps the first; and (c) neutral experts who present information and interpretations with only minimal advocacy or espousal of controversial values. In the area of overlap between (a) and (b) are advocates of groups or of value-positions who argue in terms of distinct notions of the public interest. Their system of communication is more like that of weekly or monthly journals of opinion, published for limited and self-selected audiences, than that of newspapers or television. Among the neutral experts are journalists who, when governed by a code of objectivity, seek out information to observe and to tell, but not to recommend; somewhat similar are teachers who use indicators (Johnston, 1978, p.294). The data-bank user who is an analyst for a group, and the reporter who allows the reader to become a citizen-analyst, thus represent alternative role-types of central importance; they closely resemble alternative roles for social scientists which we have discussed above.

Choosing Contributory Variables: Models of Causation

In describing processes of dissemination I have assumed that a major function of indicator series is to define problems facing a political community. But the definition of problems is of no value unless it can lead to action to deal with them. Some action, it is true, must be preceded by the growth of public concern, the mobilization of political resources, or research on the expected effects of various actions; for these preparatory steps, the definition of problems alone may be useful. Other actions may be merely symbolic, to assert our sense of control over events. But ultimately, the value of information systems lies in the actions they permit us to choose and in the consequences of those actions (Raiffa, 1968).

Thus the design of information systems should rest on the improvements in well-being or other value variables that are expected to result from the use of that information. The information we provide should aid citizens to advocate policies, after careful reasoning that compares alternatives with regard to their expected effects. If, as is usually the case, policies affect the relevant value variables only indirectly, we may need to assess whether the policies affect more directly certain contributory variables that in turn affect the value variables. We may seek to improve the level of health, but work through health services or environmental conditions; or seek to increase competence in production and citizenship, but work through schooling. In addition, we must be able to set aside statistically the effects of non-policy contributory variables that affect the values in question. To some extent our choice of contributory variables depends not on scientific research but on causal relations that are believed by the public to be true. We thus choose contributory variables in part to enlighten public debate, and not simply because of their status in scientific discourse.[15]

This process of choice of contributory variables, and changes in our choice, can be illustrated in the social goal area of elementary and secondary education in the United States. We shall take as an illustrative value variable the educational achievement of students--recognizing that this may be only a means to the student's later production, consumption, opportunity, and citizenship, but treating it as our goal.

The first related contributory variables on which data were gathered (even preceding the widespread publication of data on achievement) were measures of inputs--expenditures, numbers and qualifications of teachers, facilities available, and numbers of pupils and years they spent in school This information was needed for administrative purposes, but was also accepted by the public as related to the goal of education. As concern increased in the 1960s about racial equality in the public schools, the "Coleman Report" (Coleman et al., 1966), a cross-sectional study of over 645,000 public-school pupils, was commissioned by Congress and shifted public attention to measures of outcomes as measured by students' test scores. The results of the study also cast doubt on the efficacy of the conventional inputs and placed special emphasis on the mix of students in the school and on teachers' skills. The finding that student mixture seemed to promote achievement by minority students supported the decisions of the Supreme Court to require racial desegregation, and the racial mix in schools became an important contributory variable. Indeed, without completely conclusive and replicated findings about its effects on achievement, racial desegregation

came to be valued somewhat independently of its effects on achievement. It was a direct object of policy (a manipulable variable) and found its principal justification in the Court's judgment that it was required by the constitutional provision for "equal protection of the laws."

The 1966 Coleman Report had a significant influence on the demand for indicator data on student mixture and students' achievement, even though the report itself was not based on time series, or on "indicators" in the sense in which they later came to be defined. This relation between "indicator" variables and "non-indicator" research is not atypical, however; our choice of contributory variables will always be based on whatever reasonable causal inferences we can make, regardless of whether or not they are based on time series of national data.

Two succeeding reports having Coleman as the senior author threw further light on contributory variables in education. Coleman, Kelly, and Moore (1975) studied a possible side effect of school desegregation: the departure of white pupils from desegregated public schools, through either transfer to private schools or change of the parents' residence. They concluded that such an effect existed, undermining the aim of improved achievement. This finding provoked considerable controversy among sociologists studying education, but eventually some consensus developed that it held under certain conditions.

My purpose in citing this second report is not to state its specific conclusions, but to suggest its conceptual separation from the concerns of the earlier report. Migration, resegregation, and the role of private schools were all presumably contributory variables that should figure in a more general model relevant to educational policy. The second report, however, dealt with only one segment of the model; it did not try to assess or estimate the net effect of desegregation, which might have been positive as well as negative. What is more unfortunate, there seems to have been little effort on the part of the social-science community to incorporate these findings in more general models accounting for educational achievement.

A third report by Coleman, Hoffer, and Kilgore (1981) dealt with differences in educational achievement of students in public and private schools. This, too, stimulated widespread controversy; but some of the criticism of the report was facilitated by the prompt availability of the "High School and Beyond" data set--the first wave of a longitudinal study--on which the report was based. Like the second report, this focused on a particular aspect of the overall educational process--the differences in achievement in different types of schools. Like the second, it dealt with the issue of segregation but did not examine the effects of segregation on achievement. And again, like the second, it was greeted with controversy about its specific findings and recommendations, but little scholarly attention seems to have been devoted to the building of cumulative, inclusive, research-based models relevant to eduational policy.

How can we devote more coordinated thought to such policy models? We cannot, of course, ask that each piece of research deal empirically with the entire range of questions that would enter into such a model. Rather, this linkage must take place in the literature and in the relevant communities of researchers, through the justifications that are offered for the importance of each particular contribution. If this guiding principle

is accepted, the introductory statement of the problem in a research report will then refer to the contribution the particular research makes to general educational policy models--not simply to a current policy debate or to the basic theory of a discipline. The literature cited in the report will then also be chosen so as to link the particular work with this larger enterprise. And, equally important, the researchers trained to participate in this effort must recognize that it is something other than the pursuit of basic disciplinary theory--that it does not lie fully either in the world of the individual discipline or in the world of action (Coleman, 1972), but constitutes a domain lying between them which we need to cultivate.

Social scientists can indeed change the public's conceptions of causal relations through research. Contributory variables need not always be chosen on the basis of common-sense models of causation alone, since common sense is influenced in the longer run by science. But in this case and perhaps in others, the building of policy-relevant models may well be hindered by academic social scientists' insufficient recognition of their need. They are not motivated toward the steady development of these models either by the policy debates of the moment, or by the prestige attributed to general theoretical work within particular disciplines. The development of general models of the educational system, of the crime and justice system, or of the policy system for dealing with poverty and welfare, has not been perceived as equal in importance to contributions to basic theory. These models may draw on basic theory, and work on them may at times contribute to that theory; but because they are usually interdisciplinary and are driven by the needs of practice, they do not emerge automatically from basic disciplinary research.

Thus in addition to simply testing hypotheses offered in public debate, social scientists and policy analysts can ask broader questions as to what values are being sought and whether they are being sought appropriately. They can give higher priority to the development of "social policy models" centered about indicators of value variables. Some such models might derive from evaluation research, others from social experiments or studies of time series. The results might be not simply direct policy recommendations, but also proposals to measure on a larger scale and more regularly those contributory variables that were found to be effective in studies of special populations.

In addition to specific contributory variables that affect the realization of particular goals, we may also wish to study and publicize meausres of the capacity of the society and its decision system to function effectively (Steiner and Dorff, 1980, Ch. 10). These might include the responsiveness of the political decision system; the extent to which the members of the political community share basic values in terms of which policies are to be chosen; and the functioning of alternative subsystems such as kinship and economy, that allocate resources independently of government. The ethical values associated with these system properties will not always be as clear as those attached to particular policies, and may be the subject of conflict; but if our indicator system neglects them it may be dealing with shorter-run problems at the expense of the longer run.

The choice and use of contributory variables then depends on developments in two parallel communities: the political community that makes policy decisions, and the scientific (technical) community that assesses

the quality of measurements and the validity and significance of causal relations. Developments in both communities must be incremental and capable of correction. The political community may change its immediate focus of attention, but can still benefit from the longer-run continuity of measurements that may guide future decisions. The indicator and information systmes of various political communities may well differ from another, as Scott (1973) has recommended for indicators of development. At the same time, however, there are gains from sharing information through comparability of indicators among systems, requiring interchange and coordination such as has been carried out by OECD (1976).

Abstract Value Variables

The value variables that I have used so far for illustration have been ones conventionally used in social indicator systems; health, educational accomplishment, crime rates, and the like. The acceptance of variables of this sort as central foci of indicator systems depends on their recognition as important by broad segments of the public (including social scientists in their citizen roles), and by professionals who either deliver related services (police, physicians) or analyze their properties (biostatisticians, educational testing specialists). These are not, however, necessarily intrinsic values in a philosophical sense. In relation to a more abstract value variable such as general well-being, they may be means--contributory variables of a higher level. We shall elaborate on this relation below, both by specifying measures of well-being and by analyzing alternative operational meanings of health in greater detail.

It is important to seek more inclusive value variables, not only for philosophical reasons, but also because of decisions that any political community must make about the allocation of scarce resources. If our value indicators deal with a set of incommensurable intrinsic values, they can aid the community only up to a certain point in allocating these resources.

The policy choices that face a political community range, in terms of the indicators involved, from the specific to the general, and from means and immediate goals to more inclusive ends. Some of our measures of problems and accomplishments are indeed quite specific. The manager of a public program may monitor that program's achievement of its specific goals (e.g., providing services). When that program is evaluated he is likely to welcome "formative" evaluation that tells how to improve the program in the same specific terms.

In a slightly more general approach, the director of a health agency charged with controlling a particular disease might examine indicators of the incidence of that disease and of the conditions that affect it, in order to compare policies for dealing with it. Those indicators would permit the comparison of various programs such as preventive measures, personnel training, or the use of drugs. But a government agency concerned wth overall health policies might make use of mortality rates or patients' capacity to function, in order to compare the effects of different diseases and choose among policies affecting them. Similarly, for choices among policies affecting various types of crimes, we might compare the public's judgments of the seriousness of various types of crime.

We might, however, wish to make still more general choices and to assess the relative value of health policies and crime-reduction policies. Comparisons of this sort are typically the task of a higher level of government than the particular agency--the chief executive or its budgetary agency, the legislature, or the citizens themselves. For this purpose we would need more general bases of comparison, To make comparisons of this sort among social goal areas, we might rely on the "partisan mutual adjustment" (Braybrooke and Lindblom, 1963) of groups and organizations each of which seeks its specific goals; we might make these judgments more systematically through respondents' judgment of the importance of various particular goals, or through multiattribute utility calculations (Keeney and Raiffa, 1976); or we might try to make them explicitly in terms of a more abstract value variable or system.[16] This last option, making use of abstract value indicators, is the one we shall now explore.

Economic benefit-cost analysis provides an example of this abstract sort of choice: the maximization of a social welfare function, the gross national product (or the GNP per capita).[17] The increment that a particular program makes to the GNP is considered to be its net economic benefit. If we are willing to accept the GNP as our goal, it then serves as an abstract value in terms of which the relative contributions of other more specific values can be assessed (traded off), so that we can tell how much of our resources should be devoted to each. In addition, it may guide us toward the relevant aspects of more specific values, such as aspects of health that contribute to productivity, and help us to refine their measurement. These advantages would result from benefit-cost analysis even if data on the GNP were not published.

We must next ask whether other value variables could permit similar abstract choices. The social indicator movement has represented, in part, a protest against the values involved in economic indicators. It has resulted in a proliferation of indicator variables, some noneconomic and others (such as work force data) bordering on the economic. It has not, however, provided alternative abstract value variables in terms of which the more specific social goal areas can be compared. A significant remaining task, therefore, is to retain the general tradeoff capacity of the GNP but to exemplify it in other types of values--stressing, for example, well-being that is not associated with money and possessions, and providing for greater equality among persons in the counting of well-being.

We do not here propose the construction of "aggregative indices" that combine variables by methods such as arbitrary weights, the addition of standard scores, or factor analysis; such indices cannot provide the value-weighting of their components that we need. Duncan (1969, p. 4), for example, has argued against indices of health formed by adding together the numerical values of aspects of health (mortality and bed-disability) or similar indicators of the status of minority groups. Similarly, a number of indices of the presumed material well-being of various localities have been computed by adding variables such as median income, years of education, and the presence of municipal facilities; several of these indices have been described and criticized by Carley (1981, pp. 150-65).

In contrast, the GNP and the Consumer Price Index are aggregates for which a clear conceptual definition specifies the universe of component measures, and an external criterion variable--price--defines their weighting.

What we are seeking here is another abstract criterion variable, other than price, in terms of which the contributions of more specific values can be compared.

One such abstract variable would combine two components already familiar in the literatute on social indicators--subjective quality of life and duration in time. In principle, each interval of time for each person could be assigned a weighting value in terms of the quality of life experienced during that interval. Formally analogous weightings of time by the value of time have been proposed by Fox (1974, p. 54) and by Juster et al. (1981, p. 76) as components of social accounting systems; but the development of such systems is not a prerequisite for the use of this variable.

In connection with the evaluation of health policies, Weinstein and Stason (1976, 1977) have proposed that we not only consider the aggregate length of life that various policies will produce, but also include in that aggregate a weighting factor for the quality of those life years. The result would be a total of "quality-adjusted life years" (QALYs). In particular choices of health policies, patients would be asked to compare their life experiences when under medication with those of "full health," and judge what fraction of a year of full health would be equivalent to a year under medication. More generally, techniques that have been developed for the measurement of subjective well-being (Campbell et al., 1976) might be adapted to more general weighting of life years by their quality. Such measurements are far from ready for policy application at present; questions such as the difference between happiness and satisfaction, the cardinal properties of such indices, and the interpretation of aggregate trends over time (Rodgers, 1982), remain to be resolved. Moreover, special care will be required to estimate amounts of suffering; vagrants, mistreated children, and institutionalized persons may be concealed from the data-gatherer.

If, however, this type of measurement--a variant of utilitarianism--should become a central concern for those developing value indicators, it might provide a basis for comparison and criticism of more specific indicators and a philosophical alternative to benefit-cost analysis. Unlike economic measures, it places value in experience rather than in the satisfaction of preferences in the market. In addition, it is based on time, which is more nearly equally available to all than money, and might thus circumvent some of the inequality of weighting the demands of rich and poor in dollar terms in valuing the GNP.

Suppose, then, that the concept of quality-adjusted life years (or hours) was accepted as an abstract value variable to be incorporated in indicator information; how would we do this? Let us acknowlege that there are problems of measurement, and concentrate on the problems that would arise if we had good measures of subjective well-being as well as of time. The social indicator literature already contains information on quality of life as well as on death rates by age and on life expectancy; how would we combine them?

An annual publication based on a one-time interview could not directly measure the sum over time of QALYs over a year, for example, unless we relied on retrospection. Apart from weekly or seasonal types of fluctuations, however, the distribution of satisfactions and dissatisfactions experienced by the respondents at one time might represent those experienced

over a year. If the population remained constant, therefore, the available data on subjective well-being would be a useful surrogate for statistics on QALYs.

We wish to know simultaneously, however, whether the quantity as well as the quality of life is changing. We must first set aside in a separate statistic the size of the population as a whole; by doing so, we can compare populations of different sizes, as well as consider separately the ethical question whether twice as many lives, other things the same, are twice as good. This might lead us to seek a measure, for a single "average life," of "quality-adjusted life expectancy." An indicator of this sort, based on capacity to function, has been proposed by Chen et al. (1975, pp. 80-84). Such a calculation for subjective variables, however, seems at present to require too many gratuitous assumptions about the constancy over a lifetime of relations between personal characteristics and satisfaction.

A further problem is that our data on length of life, based on death records, do not necessarily pertain to the same individuals who report the quality of their lives. We are therefore forced to deal with population subgroups, further subdivided by age, and to present data for each such subgroup on quality of life and on probability of survival through the year. For general reporting purposes, it is these data that I suggest we present. But for analysis of particular policies, we may be able to follow particular populations over time and collect data on both survival and quality of life.

Such statistics, even in the crude form in which they would now have to be available, could be useful in providing an alternative measure of value in contrast to the economic standard. Descriptively, they could show what segments of the population were experiencing high or low quality of life relative to what would be expected from their incomes; we know already that the association is far from perfect. They would treat equally, somewhat in relation to consumption, persons who were paid unequally (by race or sex) or who were not producers for the market (the elderly). They might illuminate possible tradeoffs between quality and quantity of life, if resources could be used to increase one at the expense of the other. And especially in studies of the elderly, they might throw light on the social benefits of our efforts to prolong life, as they affect not only the elderly themselves but also those around them. These sorts of studies reflect the important use of indicator variables for particular policy judgments, and not only for national social reporting.

We thus propose that two abstract indicator variables constitute the central core of a value-based indicator system: economic benefit (the GNP or national income) and quality-adjusted life years. Together with these two variables, we must also consider their distribution over population groups as a measure of aspects of equity or of needs.[18]

This brief proposal has numerous implications, however. First we must note that the distributions of production and income, and of income and consumption are not the same. Production and consumption by individuals, especially within the family, involve components that are not priced in the market. For a full exploration of the distribution of individuals' consumption, and of the resources and obligations that affect individuals' production, consumption, and well-being, we need to measure and study

noneconomic contributory variables even if our value variable is economic. These include family relations and that aspect of health related to a person's capacity to function, as well as the models of educational effectiveness discussed above.

We must also recognize that many of the contributory variables affecting quality-adjusted life years remain to be determined. Variables affecting the duration of life itself are better known, as they draw on the knowledge of the biological and health sciences. The determinants of subjective well-being may lie closer to the individual, in intimate personal relationships, and farther from public policy than are economic variables. They may also relate to the individual's symbolic environment, and thus be affected by hopes and fears engendered by political and private discourse; for this reason, some may distrust these variables as reflecting "illusory" rather than "real" well-being. But it is precisely because they represent a counter-balance to the perhaps too "real" variables of economics and the material environment that we need to examine them.

Even though we propose QALYs as a yardstick for comparison of policy outcomes in particular social goal areas, this comparison of the effects of disparate policies is more difficult for subjective than for economic variables. It depends on tracing subtle chains of causation rather than on assigning monetary values. In principle we can compare health and crime policy as they affect QALYs, but in practice much research is necessary and problems of measurement and inference must be overcome.

To see more clearly the advantages of considering abstract value variables, let us engage in critical analysis of some indicator variables that are in current use. Two illustrative examples will relate to the areas of social mobility and health. The concept of social mobility, as we shall see, does not have a sufficiently clear valuative connotation, but can be interpreted in terms of our proposed abstract value variables; in the case of health, the concept as expressed by conventional indicators is not sufficiently general to provide the sort of guidance that it might.

Extensive and sophisticated academic studies have been directed at social mobility; this concept was chosen as a major indicator variable in an early report on social indicators (HEW, 1969). Early research in this area (Lipset and Bendix, 1959) was directed at cross-national comparisons, with mobility assuming significance both as a value (opportunity) and as a possible cause of the lack of socialism in the United States. More recent studies of "status attainment" have aimed at predicting the occupational status reached by persons in terms of their parents' education and occupation, their own education, their group membership, and other variables.

The "status attainment" concept comes nearer to being a measure of well-being than does mobility itself. Mobility, in the literal sense, may be downward as well as upward; it may occur excessively rapidly, thus failing to make use of specific human capital (Becker, 1975); and even upward mobility may bring psychic conflict and insecurity. Perhaps the hope of advancement is itself a source of well-being or of motivation to produce, and that of fair advancement a source of social cohesion; but such connections need to be verified. Thus in place of social mobility as a value variable, from a valuative perspective we might better deal with the <u>efficiency</u> of

occupational placement systems for overall production and consumption; the satisfactions that people enjoy in their work, consumption, and other activities in relation to mobility among roles; and the equity with which roles and their attendant opportunities are distributed. Status attainment comes close to measuring the satisfactions that individuals receive from changes in roles; but the passage from individual to aggregate attainment may bring with it compensating disadvantages when the advancement of some entails losses for others (Hirsch, 1976). By considering these more abstract values and treating aspects of social mobility as possibly contributory to them, we can clarify the relations between mobility and the values we seek.

The choice of "health" as an indicator variable (concept) seems obvious in view of its valuative importance as well as its relevance to an important segment of production--the health services professions and industries. Indeed, it comes near being an intrinsic value in the philosophical sense (Frankena, 1963, p. 72). Yet, like the GNP, "health" comes near being a general value indicator variable without quite having all the ethically desirable features it might.

The statistics used to measure health (or ill health) are generally of two types--incidence of disease, and capacity to function. The first of these, disease, is a disvalued condition capable of being remedied by the health professions, especially physicians. Thus a handicap, a disability, or the result of an accident or a crime may not come within the scope of a disease indicator, even though it may have the same effect as a disease on a person's production, consumption, or subjective well-being. The loss of function of one arm from a stroke is more clearly a disease statistic than the severing of that arm through an industrial accident. The dysfunctions of old age, insofar as they are not easily curable and indeed seem "normal," are not so likely to be counted in disease statistics as are the remediable or temporary malfunctions of younger persons.

The second type of health statistic, measuring the individual's capacity to function, should be able to include disabilities from whatever source they arise. Examples are statistics on days of bed-disability or restricted activity. An index combining death and disability rates into "expectancy of healthy life" has been proposed (HEW, 1969, pp. 99-100); but in counting death and permanent bed-disability equally, it weights the latter too favorably in terms of its use of productive resources and too unfavorably in terms of the subjective well-being it may entail. An index considering a larger number of levels of functioning has been proposed by Chen et al. (1975). Indicators of this type relate health (in a broad sense) to production--either on the job, or in "household production," which is closely related to consumption.

Neither disease indicators nor function-status indicators, however, reflect the subjective aspect of quality of life. Some writers (e.g., Bradburn, 1969, pp. 7-8) have pointed out that mental health is closely related to subjective well-being. Subjective well-being (in the form of pain) is among the symptoms that physicians consider, together with capacity to function, in making diagnoses of disease. But as we have noted, this transformation of information on function or subjective well-being into disease statistics can omit noteworthy variations in the more general value variable involved, simply because they do not fall within the diagnostic

categories used. The same sorts of omission can occur for deficiencies in subjective well-being as for function status. Pain or anxiety, if not traceable to a specifiable disease, may be relegated to psychiatric treatment or drug therapy more often than to an investigation of environmental, work, or family conditions. And even if a manipulable cause cannot easily be found, reporting of the incidence of low levels of subjective well-being may stimulate a search for additional causes that may be alterable.

We have suggested that conventional indicator variables can be usefully subjected to valuative critiques in view of the more abstract values that we seek. We must recognize, however, that cost and the requirement of reliable measurement lead us to use indicators that are less than perfect measures of value variables. In the health area, statistics on disease are more easily available in objective form than statistics on people's capacity to function, and these, in turn, than data on subjective well-being. For similar reasons, a national commission assessing labor force data in the United States explicitly rejected the use of indicators such as unemployment statistics to measure welfare (Adams, 1981, p. 128). In this tension between criteria, what is important is to recognize the direction in which value criteria would lead us in the longer run.

We have suggested that abstract value variables can be useful both for the calculation of policy tradeoffs and for the clarification of definitions of social goal variables. But insofar as abstract variables are used in these ways, they are considered by some to be a threat to democratic processes. Benefit-cost analysis, for example, implies a different intellectual approach from that of a politics driven by the demands of interest groups. Rather, it implies "fine tuning"--the assumption of a social welfare function and the allocation of our scarce resources so that at the margin, each unit of resources is used so as to produce the greatest contribution to total social welfare. This "fine tuning" approach is at odds, not only with the play of interest groups (though this has been also considered at times to produce a fine-tuned "resultant"), but also with the ideas that support large coalitions of groups, and that unite social movements, in the more dramatic types of politics that we know. It seems to imply an "end of ideology"--pronounced prematurely to have occurred in the early 1960s. On the one hand there seems to be a politics of experts, of calculation, of incremental tradeoffs at the margin; on the other a politics of drama, of meaningful symbols, of struggle, and of public participation. It might be argued that the politics of benefit-cost analysis--and of abstract tradeoff indicators generally--is bloodless and elitist.[19]

Yet a "politics" of abstract values such as net economic benefit (or QALYs) can never exist by itself; it can, at most, be an ingredient in a larger political process. As we consider <u>various</u> definitions of the public interest, the conflicts among these definitions themselves contribute to democratic politics. Moreover, even if one such definition should prevail, it would be at most a damping influence on the normal oscillations of democratic politics--an effort to introduce tradeoffs and optimization more into public debate and to swing less far between extremes.

Initiating and Terminating Indicator Series

We have outlined some broad criteria for choosing indicator variables in terms of their use for democratic policy choices. It remains to be seen

whether and how the variables so chosen should actually become parts of functioning indicator systems. We face this problem as a matter of "value added," expecting that there will already exist a statistical base, a degree of public and expert understanding, and many influences other than those of social scientists that bear on the choice.

The social indicator movement has stressed continuity and duration as essential qualities of indicator series. This emphasis has been a needed correction to a prevailing emphasis in social research on cross-sectional studies that lack time perspective and that provide less valid assessment of causation. Nevertheless, for public decisions short-term as well as long-term series are needed, varying not only in intervals of data collection but also in overall duration. Series must be terminated as well as begun. The very possibility that fundamental values of society may change--cited by Sheldon and Freeman (1970, p. 98) as an objection to the anchoring of indicators in values--may also require that indicator series used for decisions be changed. We must thus recognize the existing social and political mechanisms whereby indicator series are changed, and consider how they could be improved.

We shall deal primarily with indicator series that are produced by government, even though numerous privately prepared series exist. Some privately produced series, however, are produced under market constraints and are not likely to be influenced by our decision criteria. Others, in the private but non-profit sector, may make use of government or foundation support and provide a useful freedom from the constraints of government decisions; but they may not be able to create user constituencies that aid them to the same extent in obtaining continuing resources.

The introduction of a new indicator series, which comes to be gathered regularly by a government agency and used in a democratic political community, is likely to be slow and difficult. A free society, in which citizens can organize politically, allows opposition as well as support to develop. The needed support from both experts and interested groups must be developed over time. Various groups of experts may propose rival concepts. Even the development of consensus within a single expert group on choice of specific statistical measures, in relation to relevant theories, usually requires time. Conceivably this process can be speeded by use of the prior experience of other similar political communities, but this possibility needs to be demonstrated.

The initial steps toward institutionalization of an indicator statistic may come either from public demand or from experts' advances in theory and measurement. They may also come from valuative reasoning and interdisciplinary work, as we have proposed. Public demand is sometimes generated by a crisis such as a crime wave, a peak in unemployment, or the discovery of inadequacy in the abilities of military draftees in wartime. An impetus can also come from the findings of researchers, when they demonstrate that a new concept (such as the gross national product was initially) is practically and theoretically significant and is measurable.

Such an initial impetus need not lead directly to the establishment of data collection and dissemination by a governmental agency. Sometimes trial data collection may be initiated to test an organization's capacity to gather the data and to sample users' reactions. A state or local

initiative may be the source of such trial information. Private or semi-public organizations may initiate data collection in order to persuade government officials gradually of the utility of a new type of data; this has been the case with the National Assessment of Educational Progress (Bradburn, 1973, pp. 27-36) and with subjective indicators (Sheldon and Land, 1972, p. 148). Initiatives may also come from statistical associations or from government officials, as in the history of the U.S. Census. Political leaders have also proposed them.

An assessment of costs and benefits, political if not economic, will necessarily be involved in the choice of indicator variables. Not merely a current acute problem, but the sustained interest of groups, may be necessary before public funds are devoted to data collection. The possibility that information can be used for multiple purposes or by multiple groups can reduce the effective cost of one particular use. Economic statistics, for example, serve the private decisions of firms as well as those of government. If private uses dominate, the market may even generate publicly useful statistics by itself.

Several examples of the gradual process of institutionalizing indicators have been presented by de Neufville (1975, Ch. X), showing both successes and failures and their causes. Indicators of unemployment and of prices have been developed in the United States through a continual interplay among government officials, business and labor groups, and experts in statistics and economics. The process of institutionalization has typically taken place over a period of decades, with sporadic but important crises and periods when the indicators are attacked by citizen groups and require defense.

On the basis of United States experience, we suggest first that social scientists who wish to provide guidance for indicator systems recognize certain features of the existing process:

a) It is both political and academic at the same time. Social scientists in government respond to both their scientific communities and their superiors. Testimony for a statistical system must include input from interested groups as well as from experts. Thus while a "pure science" perspective is unrealistic, politically skilled social scientists can exert influence for quality and continuity as well as utility of the data presented. At the same time, academic causal research can be oriented to value variables chosen by the political community.

b) A period of decades may be required to institutionalize an indicator. Short-run payoffs are likely to be unavailable for either politicians or academics. Immediate partial victories may be gained, but they should not be confused with the eventual goal of institutionalizing an indicator series.

c) In government decision-making about indicators, the valuative aspect of an indicator variable is often subordinated to consensus and continuity.

Because of these features of the process, we suggest that the role of the social scientist is to recognize explicitly his incremental contribution. He should therefore expect that--

a) Experienced statistical advisers to a central government are likely to be skeptical of controversial values and of measures whose reliability

has not been proved. Practical considerations of accuracy of measurement, theoretical consensus, and broad political support are likely to dominate. At the same time, however, philosophical approaches to value variables need not be ignored.

b) Innovation (or termination) may have its source outside government, or in local rather than central government. The development of scientific or professional communities with a practical interest in indicators can encourage discussion of these questions apart from the political pressures of the moment. Although government is a major source of continuity of support, a scientific community can provide its own sources of continuity as governments change.

c) Trial and experimentation are essential for testing the utility of a data series. If this can be done locally, it will facilitate later national use. The experiences of nations can also be compared. Demand will have to be developed as potential users learn what they can do with a new sort of information. Difficulties, biases, and potential misuses need also to be searched out through trials, even though they can be anticipated to some extent.

d) The most general valuative questions, concerning the development of abstract value indicators, need to be examined first apart from government. Fears and controversies may well arise if a new abstract value indicator is suddenly proposed. Only after some familiarity has been gained with its measurement as well as its meaning, can it be proposed as a government-sponsored indicator.

e) Future indicators will be at least partially linked to new technologies, at least in industrial societies. Computers and video displays are likely to be used more often where appropriate staff skills are available. A perspective broader than that of the published annual volume will be required.

Hand in hand with the problems of initiation of indicator series go those of termination. It has been recognized increasingly in recent years that public programs, once initiated, can continue beyond their usefulness; and the same problem must inevitably arise for indicator series, however difficult it now seems to establish and maintain them. The need to use scarce resources efficiently, and the problem of information overload for users, require continuing review of our statistical priorities. The process of initiation cannot simply be reversed, however, by moving back from central governmental collection to private and local use--unless the demand for information is locally concentrated. One principle of effective termination of public programs seems to be that when termination is judged to be necessary, rapid and forceful action is required.

It is also possible that indicator series will need modification. In the case of price indices, for example, a particular indicator can become tied to processes of conflict resolution (such as a price index in wage bargaining between unions and management) so as to rigidify that measure. In that case, a temporary parallel use of the old and the revised indicator may bridge the gap.

For these reasons it is especially important that we focus attention

on the processes by which the "choice" of indicators can take place. We must be skeptical of a purely scientific approach; of rapid development of information systems that are intended to be useful; and of design by experts without continuing participation of users. We can facilitate the development of useful indicators by focusing the attention of academic groups on their uses. Among the relevant processes, one of the most difficult is that of persuading our fellow citizens that their specific values can be subsumed under abstract value variables. But if this can be done, it may contribute in a modest degree to the improvement of public policy debates.

NOTES

*This paper is a summary of a longer manuscript being prepared under the auspices of the SSRC Advisory and Planning Committee on Social Indicators. Numerous persons have given me useful comments on that manuscript, but for comments related to this paper I am particularly indebted to Judith I. de Neufville. A version of this paper has also been prepared for presentation at the tenth World Congress of Sociology, Mexico City, August 16-21, 1982.

[1]From an economic perspective there would be no need for us to deliberate about the choice of these variables--or other aspects of information systems--if their provision responded to a well-functioning market. The production of information for private consumption can respond to demand (e.g., the reporting of market prices in newspapers).

Insofar as information is a collective good, efficiency may be promoted by subsidizing it; then decisions as to what to subsidize arise when we do not have a clear expression of demand. If information is needed by citizens for decisions in view of the public interest, it may be considered a merit good, so that subsidy will encourage citizens to attend relatively more to the public interest than to private interests; in this case decisions are needed not only to summarize demand, but also to judge how the public interest might be served. The choice of indicator variables for policy guidance is thus itself a policy problem, though its effects are less direct than those of many other policy choices.

[2]Lasswell (1971, p. 195) pointed out that in a data-rich civilization we need commitment to goals and not simply inquiry. A "variable Olympics," conducted recently by James A. Davis for social indicators, may well have provoked a contest to produce well-measured variables without necessary policy relevance.

[3]Even the most public-spirited policy analysts, however, when seeking to maintain an organization and resources, will be driven to support that organization's narrower interests (Wildavsky, 1979, Ch. 9).

[4]Indicator variables have been classified as (1) informative, (2) problem-oriented, (3) program evaluation, and (4) decision-making (used in directing policy toward particular geographical areas) (Carley, 1980, pp. 177-78; citing Carlisle, 1972, and Edwards, 1975). The first of these categories, "informative," provides us little guidance in our choice of variables unless we know what the need for it is, and one important way to judge this need is through knowledge of what is to be done with the information. (For similar reasons the "enlightenment" function [Biderman, 1970] provides inadequate guidance.) The second and third correspond to problem definition and to assessment of the success of actions. The fourth category, dealing with allocation among areas, simply raises for local action the same problems we wish to discuss for the whole political community: should we act in a certain direction (by allocating resources), in view of the expected results?

[5]We use this term rather than "explanatory variables" to stress the decision oriented character of the models that link them to value variables. Johnston

and Carley note the distinction between discipline-based explanatory variables and variables more closely related to movement toward preferred future states (1981, pp. 241, 250, 253). Land (1975, p. 17) defines "analytic indicators" as components of models of social processes which result in "values of the output indicators," but contends that models developed for scientific purposes can be transformed into policy models by the simple addition of valuative criteria (p. 33). Basic researchers, however, are not properly motivated to include in their models just those variables that are most useful for policy purposes.

[6]For this reason the measurement of citizens' alienation, or political views, by government agencies must be viewed critically. Biases due to pressure from affected interests can also be reduced by locating measurement in independent institutions, and by use of multiple measurements of a given variable.

[7]For greatest generality we should speak of a "political system" and of the "affected population" to be served; this usage would apply to hierarchical organizations whose decisions affect non-participants and non-members, and to formal state-type organizations whose populations are deeply divided and feel little sense of community (such as the United Nations). By using the term "political community," however, we wish to suggest an aspect of a functioning democratic order by implying that most of those affected are participants. The term is defined by Easton (1965, pp. 177-79), but not with this implication.

[8]It could be argued that some aspects of the truth are not easily grasped through statistics, or that some aspects of our well-being depend on the persistence of myths and illusions. But the basic context of this paper is that of a faith that science can contribute to our well-being.

[9]Carley (1981, p. 125) points out that "government statistical agencies are duty bound to remain politically neutral." This does not mean, however, that their managers can afford to ignore politics, either partisan or organizational.

[10]The values supported by the members of such a coalition do not necessarily represent aspects of the public interest. They may, on the one hand, reflect alternative concepts of the public interest; but they may also be values accruing to distinct groups and more appropriate to an economic view of politics.

[11]Sheldon and Parke (1975, pp. 695-96) refer to "goal-oriented analyses" as lying within the scope of administrators and their agencies, and only general "enlightenment" being appropriate for the public; but citizens may also engage in analysis.

[12]At the same time we must recognize that technical information not easily understood by the public (e.g., economic or environmental) can benefit the public; and that information about a nation's environment (foreign intelligence) can sometimes be of greater benefit to the public if it is not made public.

[13]There are, of course, even longer-term changes that can be seen only with a historical perspective.

[14]Warning signals may be generated by current values of indicator variables, by extrapolation of current trends, or by more complex forecasting models. Signals of progress can not merely decrease the sense of urgency of a problem, but also encourage further efforts if they show that previous efforts have borne fruit. Examples are the gradual decline of pollutants in the River Thames, and the decrease in the United States of the disparity in educational achievement between blacks and whites.

These statistics can sensitize members of the community to needs for collective action and policy formation; but even though they are useful for highlighting problems, they are not equally useful for all sorts of problems. Time series are most relevant in problem definition if our standard of comparison is an earlier condition or trend. If the standard is an external one, such as an absolute judgment or the condition of another community or group, then a single "snapshot" observation can suffice. Large, new, "strategic" problems may lie outside the domain of past indicator series. And finally, policies should not be chosen in terms of our sense of problems alone; their justification depends also on their prospective benefits and costs, as well as on moral and legal constraints. Thus some deficiencies revealed by indicators cannot be remedied except at prohibitive costs, whereas new opportunities for improvement may arise even when indicators do not reveal a deficiency (MacRae and Wilde, 1979, pp. 31-33). Moreover, the expected effects of a proposed policy depend on its political feasibility; a widespread sense that a problem exists enhances the feasibility of policies aimed at this problem, but does not assure feasibility by itself.

[15]W. N. Dunn (1982) places policy research within a context of public argument; but even though we recognize this as a constraint affecting political feasibility, we can still seek to improve the standards of public argument.

[16]The characteristics denoted by "intrinsic" and "abstract" are not identical; the cultivation of the arts, for example, is often considered to be of intrinsic value even though it does not subsume other social goals. The type of variable that is viewed as a general end is discussed critically by E. S. Dunn (1974, pp. 107ff.) in relation to the quest for a "grand indicator."

[17]It is possible to modify the GNP, so that it becomes more nearly a measure of economic welfare, by taking account of externalities and of disparities between production and consumption (Nordhaus and Tobin, 1972).

[18]Other abstract value variables have also been proposed. Allardt (1973, pp. 65-66) has proposed a triad of abstract values--having, loving, and being. The first of these corresponds to resources that an individual can use for production and consumption, and thus approximately to things that are valued in economic terms. "Loving" refers to close personal relations, which we suggest are a major source of subjective well-being. "Being" relates to self-actualization--perhaps an aspect or an alternative definition of subjective well-being, and thus a possible intrinsic value.

[19]Altshuler (1965, pp. 338, 343) argues that "the profession which consolidates all the measures of its success into one immeasurably enhances its claim to be called expert in its sphere"; but notes also that "it is obviously impossible to specify technical qualifications for the most general evaluators."

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